Thesis	A Numerical Study on the Effect of Spur Gear Tooth Shaving On Elastohydrodynamic Lubrication
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ABSTRACT

The purpose of this thesis is to numerically investigate the effect of tooth shaving on dynamic tooth load and lubrication performance of spur gear system. The lubrication performance considered in this research consists of oil film pressure and minimum oil film thickness. The parameters of tooth shaving method are an amount of tip relief and a starting roll angle. The theory of 3-D spur gear dynamics and elastohydrodynamic lubrication are employed to evaluate dynamic tooth load and lubrication performance of the gear system, respectively. The simulated results indicate that the tooth shaving technique, with the proper amounts of tip relief and starting roll angle, can reduce dynamic tooth load. The reduction is mostly effective at the resonant speed of the gear system. However, the dynamic tooth load is increased when the gear system is operated at very high speed. With the reduction of dynamic tooth load, oil film pressure is reduced and minimum oil film thickness is increased. The calculated results are later plotted to display the oil film pressure and minimum oil film thickness distributions as a function of contacting point on gear tooth surface. From these curves, it is found that, in the unmodified gear system, oil film pressure is maximum and minimum oil film thickness is lowest at the locations before and after the pitch point. Therefore, surface pitting failure is likely to occur at these positions. On the other hand, in the modified gear system, surface pitting failure is likely to occur at the pitch point.